IEEE P802.11
Wireless LANs

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| LB234 Comment Resolutions – PHY and BF |
| Date: 2018-09-11 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Claudio da Silva | Intel |  |  | claudio.da.silva@intel.com |
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Abstract

This submission proposes resolutions to PHY and BF CIDs. The text used as reference is D2.0.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3169 | 29.5.11.1.11 | 473.7 | EVM values are missing in Table 94 | Add missing EVM values |
| 3270 | 29.5.11.1.11 | 473.7 | TX EVM requirements for SC DCM must be defined (Table 94) | See 18/1420r0. |
| 3709 | 29.5.11.1.11 | 473.7 | Table 94: column of EVM value is blank | Please define |

**Proposed resolution**: Revised

**Discussion:** EVM values for EDMG SC DCM were proposed in contribution 18/1420r0, presented to TGay in the August 29th conference call.

**Modifications:** Editor – please modify Table 94 (D2.0, page 473) as defined in 18/1420r0.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3139 | 29.3.9 | 403.19 | The transmit center frequency leakage spec should be defined for the case when the transmitter bandwidth is larger than the signal bandwidth and the center frequency of the transmitter is not equal to the center frequency of the signal (ex: 8.64 GHz capable transmitter send a 2.16 GHz signal over the lowest frequency portion of the 8.64 GHz bandwidth). In this case, the transmit center frequency leakage would appear as a spur since it is separated from the transmitted signal. The transmit center frequency leakage spec for this case should be the same as defined in Clause 20, i.e., -23 dBc. | Define the transmit center frequency leakage spec for the mention case and the trasmit leakage should be the same as defined in Clause 20, i.e., -23 dBc. |
| 3271 | 29.3.9 | 403.19 | 29.3.9 (Common requirements) is incomplete as is. CFO leakage, RX sensitivity... requirements must be defined. | See 18/1427r0. |
| 3694 | 29 | 335.3 | Rx sensitivity for EDMG SC and OFDM need to be defined | Please define or reference 11ad table when possible |

**Proposed resolution**: Revised

**Discussion:** Common requirements, including those for transmit center frequency leakage and RX sensitivity, were proposed in contributions 18/1427r0 and 18/1427r2 and presented to TGay in the August 29th and September 5th conference calls, respectively.

**Modifications:** Editor – please include the text and tables found in 18/1427r3 after 29.3.9.2.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3185 | 29.9.1.2 | 528.1 | Figure 197 looks different than all others | Redraw figure in same style as others in spec |

**Proposed resolution**: Revised

**Discussion:** For reference, currentFigure 197 is:

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**Modifications:** Please substitute Figure 197 with the following one:



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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3217 | 29.9.2.2.5 | 531.32 | "P is the value of the EDMG TRN-Unit P field plus one" It is actualy the value without adding 1 - a value of zero is a valid value | Remove "plus one" from the sentence |
| 3733 | 29.9.2.2.5 | 531.32 | The sentence "P is the value of the EDMG TRN-Unit P field plus one" does not agree with the definition of EDMG TRN Unit P field defined in Table 53 - EDMG Header-A. P should be able to be set to zero. | modify the definition of the value of P in this page as the one in Table 53 by removing "P is the value of the EDMG TRN-Unit P field" |

**Proposed resolution**: Revised

**Discussion:** It is defined in Table 53 (EDMG-Header-A) for the EDMG TRN-Unit P field that:

“Possible values for this field are:

* 0: indicates zero TRN subfields
* 1: indicates one TRN subfield
* 2: indicates two TRN subfields
* 3: indicates four TRN subfields”

**Modifications:** *Modify the sentence below, found in lines 32-33 of page 531, as follows*

“… where P is the value ~~of~~ indicated by the EDMG TRN-Unit P field ~~plus one~~ and M is the value of the EDMG TRN-Unit M field in the EDMG-Header-A plus one.”

*Modify the sentence below, found in lines 19-21 of page 533, as follows*

“The P TRN subfields at the start of each TRN-Unit transmitted with the same AWV are not indexed, where P is the value indicated by the EDMG TRN-Unit P field in the EDMG-Header-A of the packet ~~plus one.”~~

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3300 | 29.9.2.2.3 | 530.15 | change "TRN sequences" to "TRN subfields" according to the whole paragraph. | change "TRN sequences" to "TRN subfields" |

**Proposed resolution**: Revised

**Modifications:** *Please modify the paragraph found in lines 11-18 of page 530 as follows*

The Packet Type field within the L-Header together with the indication that the PPDU is an EDMG PPDU as defined in 29.3.3.2.4 (L-Header definition) are used to indicate that a packet is an EDMG BRP packet. In the EDMG-Header-A of an EDMG PPDU, the fields EDMG TRN Length, RX TRN-Units per Each TX TRN-Unit, the EDMG TRN-Unit P, EDMG TRN-Unit M and EDMG TRN-Unit N are used to indicate the length of the training field, the EDMG BRP-RX/TX packet configuration, the number of TRN ~~sequences~~ subfields in a TRN-Unit that are used for channel estimation, the number of TRN ~~sequences~~ subfields in a TRN-Unit that are used for beamforming training, and the number of consecutive TRN subfields within EDMG TRN-Unit M which are transmitted using the same AWV, respectively.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3218 | 29.9.2.2.7 | 538.11 | In the formula we have $TRN\_BASIC\_k^{i\_tx}$ rather than $r\_{TRN\_BASIC}^{i\_tx}(k)$ This is an error | replace as in comment |
| 3219 | 29.9.2.2.7 | 541.1 | I believe $TRN\_BASIC^{i\_tx}$ should be replaced by $r\_{TRN\_BASIC}^{i\_tx}$ twice in this paragraph | replace as in comment |

**Proposed resolution**: Accepted

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3277 | 29.9.2.2.1 | 529 | The description "The transmitter may change the AWV used in the transmission of each of the last M TRN subfields in each TRN-Unit present in the TRN field" is imprecise as it depends on the value of N. | Reuse the more clear descriptions as e.g., may change the AWV at teh beginning of each set of N TRN subfields, where N is between 1 and .. Or complete the sentence with "by setting N=0". |

**Proposed resolution**: Revised

**Modifications:** *Please modify lines 24-27 of page 529 as follows*

The transmitter may change the AWV ~~used in the transmission of each of the last M TRN subfields in~~ at the beginning of each set of N TRN subfields present in the last M TRN subfields of each TRN-Unit present in the TRN field. The transmitter may ~~use the same AWV in the transmission of consecutive TRN subfields and may also~~ transmit all TRN subfields of a TRN field with the same AWV.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3536 |  | 12.32 | Figures 134-138 should be named differently from each other and indicate the example case they represent | As in comment |

**Proposed resolution**: Revised

**Modifications:** *Please change the caption of Figures 134-138 as follows:*

* Figure 134 - ~~Example of~~ BRP TXSS when comprised of all six phases
* Figure 135 - ~~Example of~~ BRP TXSS example: Responder uses one DMG antenna when performing measurements
* Figure 136 - ~~Example of~~ BRP TXSS example: Responder performs measurements using multiple DMG antennas simultaneously
* Figure 137 - ~~Example of~~ BRP TXSS example: Initiator is antenna pattern reciprocal, and the responder is not antenna pattern reciprocal and is not DMG antenna reciprocal
* Figure 138 - ~~Example of~~ BRP TXSS example: Initiator is DMG antenna reciprocal, and the responder is antenna pattern reciprocal

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3389 | 10.43.9.5.2.2.1 | 278.6 | In Figure 135, the responder has DMG antenna 0 and 1 and does not have DMG antenna 2 | change "DMG antenna 2" to "DMG antenna 0" |

**Proposed resolution**: Revised

**Modifications:** *Please modify line 6 of page 278 as follows*

…responder used DMG antenna ~~2~~ 0 and the initiator used DMG antenna 0. If the responder in this example was…

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3693 | 10.43.9.5.2.2.1 | 279.17 | A STA transmitting an EDMG BRP-TX packet as part of SISO BRP TXSS may use a different DMG antenna for header and psdu compared to TRN. In this case, we should specify how CCA should be performed. Since it is SISO, there is no implication for MIMO CCA. | Please specify how CCA should be done in this particular case |

**Proposed resolution**: Rejected

**Discussion:** BRP TXSS is no different from the conventional sector-level sweep (SLS) procedure as far as supporting the training of multiple DMG antennas. (Recall, as defined in 9.35.2 [11ad], that sector sweep allows both the initiator and the responder to switch antennas during the procedure.) In both SLS (see figure below) and BRP TXSS, the training consists of a sequence of packets transmitted by the initiator and responder with a pre-defined IFS and no CCA is defined during the procedure. The acknowledgement phase at the end of the procedure may be used to indicate whether a collision happened.



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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3350 | 10.43.9.5.2.4 | 286.10 | "the Aggregation Requested field" should read "the Channel Aggregation Requested field" | As in comment |
| 3351 | 10.43.9.5.2.4 | 286.7 | "the Aggregation Requested field in the DMG Beam Refinement element" should read "the Channel Aggregation Requested field in the DMG Beam Refinement element" | As in comment |
| 3352 | 10.43.9.5.2.4 | 286.31 | "the Aggregation Present field within the DMG Beam Refinement element" should read "the Channel Aggregation Present field within the DMG Beam Refinement element" | As in comment |

**Proposed resolution**: Accepted

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3028 | 10.43.6.3.3 | 241.17 | Spelling | Change " BS FBCK" to "BS-FBCK" |

**Proposed resolution**: Revised

**Discussion:** The commenter is correct that 241.17 has a typo. For the editor’s reference, “BS-FBCK” is actually mistakenly written as “BS\_FBCK” and not “BS FBCK” as pointed out by the commenter.

**Modifications:** *Please modify line 6 of page 278 as follows*

…the feedback, the initiator shall set the ~~BS\_FBCK~~ BS-FBCK and BS-FBCK MSB fields to the AWV ID rather than the…

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3078 | 9.4.2.129 | 92.9 | This entire section introduces a lot of new information elements, which is in and of itself a privacy concern that could perhaps justify closer scrutiny (e.g. is this technology likely to be used by private persons who would be negatively impacted by the enhanced ability to profile, geolocate or track those individuals?). But there is also a concept of "best quality" that doesn't read well: best in relation to what? Best is a superlative: good, better, best. I think this requires further qualification. | As in comment. |

**Proposed resolution**: Rejected

**Discussion:** The DMG Beam Refinement element is used to request and respond BRP procedures, which are used to improve TX/RX antenna configurations. The new fields defined in 9.4.2.129 are necessary to support new BRP procedures defined in 802.11ay. The use of information present in the DMG Beam Refinement element to profile, geolocate, and track users, or any other privacy concern, is unclear. It should also be noted that there are no known attacks published on devices based on 802.11ad. Given that 802.11ay is just enhancing beamforming procedures defined in 802.11ad, the Task Group will respond if and when such attacks are published.

It is worth noting that the paragraph in question ends with the statement: “(T)he determination of best quality is implementation dependent.” “Best” is used throughout DMG and EDMG beamforming-related clauses, among others, in 802.11-2016 and it is not further qualified on purpose: This gives the opportunity for different implementations use their own metrics and procedures, ultimately leaving the door open for innovation and product differentiation.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3529 | 9.4.2.255 | 122.3 | reference "EDMG BRP Request element is defined in 0." 0 is wrong. | fix reference as Figure 68 --EDMG BRP Request element format |

**Proposed resolution**: Accepted

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3237 | 10.43.9.5.2.3 | 285.25 | "A STA that is part of a MIMO BRP TXSS shall provide feedback for each of the receive chains trained in the procedure, as defined in 10.43.9.5.3" - the feedback is for DMG (RX) antennas and not for TX chains. The same set of TX chains may be used by different sets of antennas in this procedure. | replace rx chains with antennas |

**Proposed resolution**: Revised

**Modifications:** *Please modify lines 25 and 26 of page 285 as follows*

A STA that is part of a MIMO BRP TXSS shall provide feedback for each of the ~~receive chains~~ DMG antennas trained in the procedure, as defined in 10.43.9.5.3.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3530 | 9.4.2.255 | 122.10 | "The L-RX field indicates the number of TRN-Units requested by the transmitting STA as part of beam refinement." Not clear what type of beam refinement performing. | add sentence "for Rx beam refinement" to be similar to BRP Request element. |

**Proposed resolution**: Revised

**Modifications:** *Please modify lines 10 and 11 of page 285 as follows*

The L-RX field indicates the number of TRN-Units requested by the transmitting STA as part of receive beam refinement.

*Please modify lines 13 and 14 of page 285 as follows*

The L-TX-RX field indicates the requested number of consecutive TRN-Units for which the transmit AWV remain with the same AWV configuration as part of simultaneous receive and transmit beam refinement.

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| **CID** | **Clause** | **Page** | **Comment** | **Proposed change** |
| 3532 | 9.4.2.255 | 122.25 | "The value of the Requested EDMG TRN-Unit M field plus one indicates the requested number of TRN subfields within a TRN-Unit that can be used for transmit training, as defined in 29.9.2.2. The value of this field plus one is an integer multiple of the value indicated in the Requested EDMG TRN-Unit N field."a value of two indicates three requested TRN subfields if the Requested EDMG TRN-Unit M field is equal to 3, 6, 9 or 12, a value of two indicates eight requested TRN subfields if the Requested EDMG TRN-Unit M field is equal to 8 or 16, and a value of three indicates four requested TRN subfields." If M = 3.6.9 8 or 16 then # TRN fields = 4,7,10,9 or 17 and are not divisible. | check math and change numbers as appropriate |

**Proposed resolution**: Revised

**Discussion:** The first paragraph of page 123 is wrong – correct values for EDMG TRN-Unit N are defined in Table 53 (EDMG-Header-A) and clause 29.9.2.2.3 (EDMG BRP packet header fields). Correct values are as follows:

* 0: indicates one TRN subfield
* 1: indicates two TRN subfields
* 2: indicates three TRN subfields if EDMG TRN-Unit M is equal to 2, 5, 8, 11 or 14; indicates eight TRN subfields if EDMG TRN-Unit M is equal to 7 or 15.
* 3: indicates four TRN subfields

**Modifications:** *Please modify the first paragraph of page 123 as follows*

The Requested EDMG TRN-Unit N field indicates the requested number of ~~TRN subfields per Requested EDMG TRN-Unit M field~~ consecutive TRN subfields within EDMG TRN-Unit M which are transmitted using the same AWV. A value of zero indicates one requested TRN subfield, a value of one indicates two requested TRN subfields, a value of two indicates three requested TRN subfields if the Requested EDMG TRN-Unit M field is equal to ~~3, 6, 9 or 12~~ 2, 5, 8, 11 or 14, a value of two indicates eight requested TRN subfields if the Requested EDMG TRN-Unit M field is equal to ~~8 or 16~~ 7 or 15, and a value of three indicates four requested TRN subfields.